

FIG. 25. *E. alatus*, beginning of wing. *a*, debris formed by the remains of chlorophyll-holding cells of stoma which lined the air space; *b*, heavy cuticle of epidermis in two sections as seen by *b'* and *b''*; *c*, epidermis cell; *d*, cells of phellogen layer; *e*, chlorophyll-holding cells; *f*, collenchymatic cell; *o*, opening of stoma.

FIG. 26. Shows the origin of growth in fig. 25 more plainly: *a*, the debris thrown to the end; *b*, cuticle; *c*, epidermis; *d*, air space of stoma; *e*, chlorophyll-holding cells.

FIG. 27. Diagram of young stem of *E. alatus*, with only two wings started: *a*, epidermis and outer cylinder; *b*, palisade cells; *c*, inner cylinder; *e*, young cells of phloem and cambium layer; *f*, wood cells; *g*, pith; *x*, wing broken off.

FIG. 28. Sketch of cross section at early stage, showing how much is gained in circumference by the wing formation. Only two started and not far developed: *a*, epidermis; *b*, debris around the opening of the stoma; *c*, space with no epidermis where wing belongs; *d*, wood; *e*, pith.

FIG. 29. Same as 25, but represents the wing well started: *x*, wing; *y*, phellogen cells; *a*, epidermis and outer cylinder; *b*, palisade cells; *c*, inner cylinder; *d*, cuticle and debris.

FIG. 30. Sketch in outline of a two-year-old wing: *a*, the first; *b*, the second year's growth.

FIG. 31. Cross-section of two-year-old stem: *x*, first year's growth of wing; *y*, second year's; *a*, little wing of second year.

## A tramp in the North Carolina mountains. II.

L. N. JOHNSON.

One of the first plants to catch the eye of a stranger in the mountains is the *Rhododendron*. Before we reached Asheville we began to notice its dark glossy leaves and beautiful pink clusters, brightening the woods along the track, and as we got further west it became abundant. All through the mountains we found the common *R. maximum*, and we never tired of looking at it. In the lower valleys it was past its prime, but on the highlands and along the ridges it was in full bloom, and the great thickets of dark green, thickly starred with the rose-colored flowers, were worth going far to see.

In Cashier's valley they find the purple-flowered *R. Catawbiense*, but not a single flower could we find still hanging to its branch.

Another, and the most interesting and remarkable member of the genus, is the *R. Vaseyi*. This, too, grows in Cashier's valley, over toward Chimney Top. We saw it growing with most of its interesting neighbors in the exten-



sive grounds of Mr. H. P. Kelsey, at Highlands. We are indebted to him for the facts concerning its history.

It was discovered by Vasey, some ten years ago, near Webster, in Jackson county, and not long after in Cashier's valley. It belongs to a section of the genus most of whose representatives are Asiatic, and hence its discovery here was especially noteworthy. It has a bright pinkish corolla, and some of the lobes are spotted at the base, as in *R. maximum*. It differs markedly from our other rhododendrons in having deciduous leaves.

Jackson county was believed to be the only locality for the species till Mr. S. T. Kelsey discovered it, growing in abundance on Grandfather Mt., Mitchell county, N. C. In each locality it forms great beds, and when in full bloom is said to be magnificent. In Jackson county it grows in rather low grounds, and intermingles with *R. maximum*, *Azalea calendulacea*, and *A. aborescens*, while on Grandfather Mt. it is massed with *R. Catawbiense* and *Kalmia latifolia* mostly. It grows almost on top of the mountain, at an elevation of nearly 6,000 feet.

Growing with the Rhododendrons, and, of course, related to them, were the Azaleas, as we have mentioned. The large white blossoms of *A. arborescens* shed a delicious fragrance along the river banks, but not till we reached the highest mountains did we find *A. calendulacea* still in bloom. On Wayah Bald, in the Nanteholas, we at last came upon a thicket fairly ablaze with its brilliant flame-colored flowers. It is certainly the most showy species of the genus. The blossoms change their color with age, so one may find on the same hill-side flowers of every shade from scarlet to yellow. Both these species reach a height of a dozen feet or more.

One can not fail to be impressed with the great size reached by many of the Ericaceæ in these mountains. Besides the Rhododendrons, Kalmias and Azaleas, which often reach the size of small trees, there are, among others, a tree-like *Clethra* (*C. acuminata*) and the Sorrel-tree (*Oxydendrum arboreum*). We several times, from a distance, mistook the long, fragrant white racemes of the former for those of the latter, but it was a careless blunder. The *Clethra* bears its racemes singly on the tips of the branches, while the long, one-sided sprays of the Sorrel-tree are clustered. The flowers of the latter, examined singly, are not particularly beautiful, being only white bells about the size and shape of the blossoms of *Vaccinium*, but when massed they present a



striking appearance. We saw trees of this species which were probably thirty or forty feet high. It takes both its scientific and its common name from the sour taste of the leaves.

We found the *Vacciniums* almost everywhere, some of them reaching almost to the dignity of small trees, and several possessing an interest to a hungry man aside from their botanical peculiarities. They were in fruit at the time of our visit, though not generally ripe.

One of the most common plants along the water-courses was a puzzle to us for a time, especially as it was in full fruit. Its drooping branches were thickly set with alternate spinulose serrate evergreen leaves, arranged in two ranks, and beneath were long, densely-packed racemes of green fruits, resembling those of *Andromeda*. It was at length identified as *Leucothoe Catesbæi*, which blossoms in May and June, fringing the streams with white.

On the very top of Whiteside, growing on the rocks, in the moss, we found a beautiful little heath—*Leiophyllum buxifolium*. It reaches a height of only five or six inches, and its glossy evergreen leaves are closely matted together. We were, unfortunately, too late to find it in bloom, but, judging from the fruits, it must a month earlier be literally covered with the white flowers.

It seemed like a glimpse of the New England woods to find, as we climbed the mountains, the ground along the road-side covered with the trailing *arbutus*. We found it on almost all the mountain-sides, and in a few places saw another old friend—the wintergreen.

There were many other small *Ericaceæ* in the woods—among them the *Chimaphila maculata* and the two *Monotropas*, but doubtless the most interesting member of the family in all this region is the *Shortia galacifolia*. This did not come within the range of our tramp, but we were fortunate enough to see it growing at Mr. Kelsey's, and to obtain specimens. The history of the plant is perhaps not familiar to many of our readers.

It was discovered years ago and described (I think from a specimen in fruit), but the exact locality was forgotten, and all efforts to rediscover it failed till within a few years. Now it is known that in one locality at least it exists in abundance, and it is somewhat of a puzzle how it remained unknown so long.

We ascertained what was possible in regard to its habitat



from Mr. Kelsey, who visited the region last spring and collected many specimens, both plants and flowers. We can not do better than let him tell the story in his own words. He says: "Its native habitat is on or near the banks of the Jocassee (lower Whitewater) river, in Jocassee valley, Oconee county, S. C., about thirty-three miles from Highlands. When I was there—the middle of March—it was in full bloom and covered the banks of the river by acres, and extended up and down the river more or less for three miles. In places it grew in solid beds like the *Galax aphylla*. This one locality, as far as is known, is the only place where *Shortia* grows in the world, and until quite lately its real presence here was not positively known and determined."

It was growing in abundance on his place, in the shade along the banks of a little brook, where it had been transplanted. With it grew the *Galax aphylla*, with which we had already become familiar. It was easy to see how *Shortia* gets its name *galacifolia*. The leaf very closely resembles that of *Galax* in general appearance, though the latter is heart-shaped at the base and crenately-toothed, while the former is nearly orbicular and serrate, with rounded mucronate-tipped teeth. In each all the leaves are gathered in a radical cluster. While to one familiar with both the differences are plain, we could see that it would be very easy, on a hasty examination, to confuse *Shortia* with *Galax*, when not in flower. May not this partly explain why it has not sooner been recognized? It seems likely that it must exist in other parts of that region, but the chances are certainly in favor of its being overlooked, from this resemblance to *Galax*, which is abundant almost everywhere in the mountains. This is especially true on account of its very early time of flowering—before most of the spring flowers are out.

As for the flowers themselves, we only saw a single dried specimen, so our description is not worth much. If I mistake not, there rises a slender scape-like stalk from the cluster of radical leaves, and this bears a single blossom about three-fourths of an inch in diameter. The dried flower resembled slightly that of *Chimaphila*, and like that was white.

In closing this brief account of some *Ericaceæ* of the mountains, we would call attention to the great number which bear evergreen leaves. Not only are there many small ones like the wintergreen and the *Arbutus*, but the great masses of *Rhododendrons*, *Kalmias* and others, must keep the woods green all the winter through.

*Evanston, Ill.*